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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/146,851	09/03/1998	MARK MCQUEEN	3522US(97-10	9940

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EXAMINER

FENTY, JESSE A

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 11/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/146,851

Applicant(s)

MCQUEEN, MARK

Examiner

Jesse A. Fenty

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-6, 9, 10, 21-24 and 27-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 29-32 is/are allowed.
- 6) ☒ Claim(s) 3-6, 9, 10, 21-24, 27 and 28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-6, 9, 10, 21-24, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe (U.S. Patent No. 6,124,189) in view of Fukuda et al. (U.S. Patent No. 6,479,899).

In re claim 1, Watanabe (Figs. 7A-7C) discloses a semiconductor device comprising:

A single contact plug (11c) extending through a first barrier layer (108) planarized down to a transistor gate member, said single contact plug in electrical communication with an active region (107) of a semiconductor substrate (100); and

An individual contact land (114) disposed atop said single contact plug and a portion of said first barrier layer, wherein said contact land is wider than said single contact plug and is substantially planar.

Watanabe does not expressly disclose an upper contact extending through a second barrier layer, said second barrier layer disposed over said first barrier layer, to form an electrical contact with said individual contact land. Fukuda et al. discloses an upper contact (14) extending through a second barrier layer (12), to form an electrical contact with a lower, wider contact land (10). It would have been obvious for one skilled in the art at the time of the invention to improve

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upon the device of Watanabe in the manner of a more comprehensive interconnect structure as disclosed by Fukuda for the purpose, for example, of providing a multi-level interconnect structure that will provide greater device insulation of the device active region yet provide the desired conductivity of Fukuda to upper level devices.

In re claims 3 and 21, Watanabe (Figs. 7A-7C) discloses a semiconductor device, comprising:

An intermediate structure comprising a substrate having at least one active area including at least one implanted drain region (107), and at least one implanted source region (107a), said intermediate structure further including at least one transistor gate member (130) spanned between said at least one drain region and said at least one source region on said at least one active area;

A first barrier layer (108) planarized down to said at least one transistor gate member, said at least one active area and adjacent said at least one transistor gate member;

At least one drain contact plug (111C) extending through said first barrier layer, wherein said at least one drain contact plug is in electrical communication with said at least one drain region on said substrate;

At least one source contact plug (same) extending through said first barrier layer, wherein said at least one source contact plug is in electrical communication with said at least one source region on said substrate;

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An individual drain contact land (114) disposed atop each of said at least one drain contact plugs and a portion of said first barrier layer, said individual drain contact land wider than said at least one drain contact plug and substantially planar; and

An individual source contact land (same) disposed atop each of said at least one source contact plugs and a portion of said first barrier layer, said individual source contact land wider than said at least one source contact plug and substantially planar.

Watanabe does not expressly disclose a second barrier layer with second source and drain contacts extending through said second barrier layer to establish communication with the source and drain contact lands. Fukuda et al. discloses an upper contact (14) extending through a second barrier layer (246), to form an electrical contact with a lower, wider contact land (10). It would have been obvious for one skilled in the art at the time of the invention to improve upon the device of Watanabe in the manner of a more comprehensive interconnect structure as disclosed by Fukuda for the purpose, for example, of providing a multi-level interconnect structure that will provide greater device insulation of the device active region yet provide the desired conductivity of Fukuda to upper level devices.

Watanabe does not expressly disclose a field oxide layer. Fukuda discloses such a layer (2). It would have been obvious to one skilled in the art at the time of the invention to use a field oxide layer in the device of Watanabe for the well known purpose of isolating one device from another in a semiconductor substrate.

In re claims 4 and 22, Watanabe in view of Fukuda disclose the devices of claims 3 and 21 respectively, further comprising drain contact metallization (14) in electrical communication

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with said at least one upper drain contact; and source contact metallization (upper 248) in electrical communication with said at least one upper source contact.

In re claims 5 and 23, Watanabe in view of Fukuda disclose the devices of claims 3 and 21 respectively, wherein said at least one source contact plug extends between at least two source regions.

In re claims 6 and 24, Watanabe in view of Fukuda disclose the devices of claims 3 and 21 respectively, wherein said at least one drain contact plug extends between at least two drain regions.

In re claims 9 and 27, Watanabe in view of Fukuda disclose the devices of claims 3 and 21 respectively, wherein said at least one upper source contact extends between at least two individual source contact lands.

In re claims 10 and 28, Watanabe in view of Fukuda disclose the devices of claims 3 and 21 respectively, wherein said at least one upper drain contact extends between at least two individual drain contact lands.

Allowable Subject Matter

3. Claims 29-32 are allowed.
4. The following is a statement of reasons for the indication of allowable subject matter:
 - a. In re claims 29-32, the limitation comprising at least a first barrier layer said active area and field oxide layer and a second barrier layer over said first barrier layer and planarized down to said gate member is neither anticipated nor obvious over the prior art of record.

Response to Arguments

5. Applicant's arguments filed 08/15/03 have been fully considered but they are not persuasive.

b. In response to applicant's argument that the element (114) of Watanabe is a wiring layer and not a contact land, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Here, the element (114) of Watanabe is a metal layer atop the first barrier layer, wider than the contact to the source/drain regions, as claimed.

c. Secondly, applicant argues that because dependent reference Fukuda discloses a memory device, the communication between layers is not obtained. On the contrary, though Fukuda discloses capacitive structures atop the stacked semiconductor device, Fukuda also discloses a contact structure not connected to the capacitors. However, that the communication structures of Fukuda are used to communicate to capacitor devices would not preclude one skilled in the art from using the communication structure for a different purpose, as relied upon in the above rejection.

d. Applicant argues (pp. 16, 1st full ¶) that the Fukuda reference, the plug (14) is formed in the second insulating film (12) over only the connecting pad (10) and not over the bit line 10'. Examiner notes that Fukuda is depended upon to show the known structure of wider contact lands atop barrier layers connected to source and drain

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contacts. The fact that Fukuda does not expressly disclose the contact structure connected to the bit line does not make the reference faulty. Fukuda discloses the contact structure, that if, applied to the bit line contact of Watanable, would product the claimed invention.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jesse A. Fenty whose telephone number is 703-308-8137. The examiner can normally be reached on 5/4-9 1st Fri. Off.

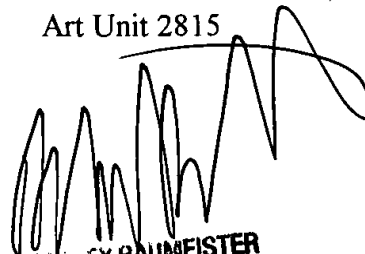
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 703-308-1690. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Jesse A. Fenty
Examiner
Art Unit 2815

JAF



BRADLEY BAUMEISTER
PRIMARY EXAMINER